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FARMSTEAD IN
NORWAY'S FAR NORTH

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IN THIS ISSUE

FRONT COVER

Farmstead in Norway's Far North

The farmstead shown on the cover is Bratlie, one of the larger farmsteads of north Norway, located on the Pasvikelv River, the border between Norway and Russia. The buildings are new, as are most farm buildings in northern Norway. During World War II the retreating Germans burned 95 percent of the buildings in the north.

BACK COVER

Northern Norway

Norway last year launched a 10-year program to develop the agriculture and industry of its northland. Under this program, the peculiarities of farming in the far north, where the sun shines continuously during the short summer and disappears in midwinter, are receiving particular attention.

Credit for photos is given as follows: p. 181, U. S. Army; pp. 184, 187, Ralph S. Yohe; pp. 190-191, Robert N. Anderson.

NEWS NOTES

Secretary Comments on Drop In U.S. Farm Exports

Secretary of Agriculture Ezra Taft Benson has stated that a 31-percent drop in United States agricultural exports in 1952-53 emphasizes the need for effective action to assure the American farmer a fair share of world markets.

Commenting upon announcement by FAS of the 1952-53 agricultural export decline the Secretary said:

"The decrease in agricultural exports has been a matter of concern to the new Administration in the Department ever since it took office. Our declining export situation points up sharply our need for more effective farm programs and for foreign trade policies that will not only assure the United States farmer good markets at home, but which also will widen his markets abroad.

"There is actual need in the world for more of the goods our farms produce. The question is how to get the American farmer and the world's customers into the market place together so they can do business. We are moving ahead on this problem. For example, a study of all factors affecting our foreign trade is being initiated by a recently appointed bipartisan Foreign Economic Commission. On the recommendations of this group and from other sources we hope to base a new foreign trade policy so that our commodities will move abroad in increased volume."

The value of United States agricultural exports dropped to $2,815,407,000 in 1952-53 from a record total of $4,053,030,000 in 1951-52, reaching the lowest level since 1944-45. Agricultural exports constituted only 19 percent of total United States exports, compared with 26 percent the year before.

FOREIGN AGRICULTURE ALICE FRAY NELSON, EDITOR

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Russian Agricultural Potential*

by LAZAR VOLIN

The traditional close association of Russia and its people with agriculture is well-known. Before the last war, more than half of the Soviet population lived on the land; now, probably somewhat less than half of them do. In our own country about one-sixth of the people live on farms. To be sure, in the Soviet Union, as in other countries passing through an industrial revolution, the number of people directly dependent on agriculture for a livelihood has decreased during the past half century. At the same time, the non-agricultural and total population has grown rapidly.

At the beginning of 1914, the population of Russia, exclusive of territories lost during and after World War I, was estimated at 138 million. Twenty-five years later, it had increased to 170 million. And the figure would have been larger had it not been for the heavy toll taken by World War I, revolution, agricultural collectivization, and famine. On the present enlarged territory of the U.S.S.R., the population at the beginning of 1940 was estimated at about 196 million.

Statistical information on population for the postwar period has been meager. But authorities agree that the present population of the enlarged territory of the Soviet Union is more than 200 million. The statement of Beria, made in 1951, that the annual population growth exceeds 3 million, is considered reasonably trustworthy by demographers. Whether such an increase will continue for a number of years, making it necessary to feed more and more mouths, is problematical. The trend may change. Increasing industrialization and urbanization, and their effects on family life, are likely, in time, to cut down the high birth rate, which is the primary cause of the large population growth in Russia. As Eugene Kulischer puts it:

"In spite of all the efforts of the Soviet Government to increase the birth rate, Russia persistently goes the way of all westernized nations, with 45 births per thousand on the eve of World War I, less than 40 in 1930, around 35 in the later 1930's and less than 30 at present. The decrease in fertility is beginning to outstrip the decrease in mortality, so the rate of population growth is already somewhat slowed down." (*Foreign Affairs,* October 1952.)

But whatever the increase in the population of the Soviet Union in, say, 25 or 30 years, the stubborn fact is that a large and growing number of people must be fed and clothed. Hence, the requirements for farm products are heavy and increasing.

These requirements would have been even greater if the Soviet rulers had attempted to carry out their avowed objective of improving living standards. But, so far, they have given mere lip service to that objective and have devoted their energies and the resources of the country to building up heavy industry, producing capital goods, and increasing armaments.

This was recently confirmed by the present head of the Soviet Government, G. M. Malenkov, in a speech before the Supreme Soviet of the U.S.S.R. (reported in *Pravda* and *Izvestiya* on August 9). In 1953, about 70 percent of industrial labor is engaged in heavy industry and approximately 70 percent of the industrial output consists of means of production or armament goods. While production of capital goods increased 55 times in 28 years, according to Malenkov, the output of consumers' goods increased only 12 times during the period. The production of capital goods in 1953 is more than three times as large as it was in 1940, while the output of consumers' goods shows an increase of 72 percent. According to Malenkov total capital investment in heavy industry during the period 1929-52 constituted 638 billion rubles (at the current level of prices), in transportation 193 billion, in light industry producing consumers' goods 72 billion, and in agriculture 94 billion rubles. Whatever their flaws may be, these figures certainly demonstrate beyond peradventure that the standard of living of the

*Based on a paper read at the Fourth Conference on Problems of American Foreign Policy. University of Indiana, Bloomington, July 10, 1953.

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people of Russia was sacrificed by the Kremlin on the altar of lopsided industrialization and militarism. It remains to be seen whether Malenkov's promise of more consumers' goods for the people will be implemented. Malenkov also complained of the lag in the development of agriculture. Postwar recovery of agriculture has, in fact, trailed that of industry. How the agriculture of Russia is equipped to cope with the problem of feeding and clothing its millions is one of the crucial questions in the examination of Russia's strength and weakness.

The Cropland

One must guard against exaggerated notions about the agricultural resources of Russia, often depicted in colors either too rosy or too dark. The latter attitude is particularly dangerous, because we are locked in a political and ideological conflict with the U.S.S.R. and must not underestimate the power of our adversary.

The first striking fact, and one that often surprises those who look at Russia's vast territory on the map, is that much of the country is not suitable for farming.[1] Among the unsuitable areas are the tundra wastes and marshes in the north, and the mountainous areas and deserts in the east and south. Also, much of the huge northern forest zone is poorly adapted for farming because of inferior soils and the short growing season. Before World War II, only slightly more than 10 percent of Russian land was classified as tillable, that is, suitable for crop production. If one included permanent meadows and pastures, some of which could be converted to cropland, the proportion of agricultural land would be about 25 percent of the total area. In Germany and France, comparable figures showed more than 40 percent for tillable and more than 60 percent for all agricultural land. In the United States the figures are 27 percent and 65 percent, respectively.

These figures for the Soviet Union do not mean that its agricultural area is rigidly fixed. It is conceivable that with the progress of agricultural science and the continuous improvement in farm practices, some of the land today considered unsuitable for farming may in the future be added to the agricultural area. But in the foreseeable future, the possibilities cannot be rated very high. Much has been heard, for instance, about the extension of farming into the vast area of the far north, beyond the polar circle. But, so far, such arctic farming is experimental and costly.

More important to agricultural development is irrigation in the south. Irrigation was, until recently, confined to the cotton growing regions of Soviet Central Asia (Turkestan) and Transcaucasia. The total irrigated area was small, 15 million to 20 million acres, compared with a total crop area of 370 million to 380 million acres. But, in 1950, a new large irrigation program, mainly in the semiarid southern and southeastern European regions of the U.S.S.R., was announced. The program calls for irrigation of close to 15 million acres, about 3 million of which are to be in Central Asia and the remaining 12 million in the European part of the U.S.S.R. However, much of this land was already in crops, so that the net addition to cultivated land, if and when the project is successfully complete, will be relatively small. In any event, the very fact that it is necessary for the Soviet Government to resort to a costly irrigation construction program substantiates the thesis that there is no sizable area of additional good agricultural land available.

Some land could, and doubtless will, be brought into cultivation by reclamation (as in the Pinsk marshes in Belorussia). Possibly some grazing or marginal land may be converted to crop production as a result of the construction of new railroads, such as the South Siberian. As a matter of fact, a great deal of such marginal land in the semiarid zone was brought into production in the early 1930's but it has not worked out well. In the latter 1930's the crop area was quite stable. It is reasonable to assume that it would have been further expanded if good land had been available, especially since the increased mechanization of farming has facilitated acreage extension.

It is true that the Soviet postwar 5-year plan, promulgated in 1946, contemplated not only a recovery from the drastic wartime decline of the acreage but also a moderate expansion. The plan set as a 1950 total crop acreage goal 392 million acres, compared with 378 million in 1938 (estimated for the present territory), and 285 million in 1945, the last war year. However, this goal was not reached in 1952, when the total crop area was officially estimated at 384 million acres.

[1] I discussed this matter in greater detail in a *Survey of Soviet Russian Agriculture*, Monograph 5, U. S. Department of Agriculture, August 1951.

Apart from the total acreage under all crops, many changes have taken place in the distribution of acreage among various crops and groups of crops. For instance, both before and after the war wheat acreage was increasing at the expense of the important rye area. The proportion of grains in the total acreage declined, while that of the group of more intensive food and industrial crops, such as sugar beets and cotton, increased. Especially, the share of grasses or tame hay, and other forage crops, has been increasing. In other words, the utilization of land resources has changed in emphasis, becoming more intensive.

The Climatic Factors

Climate also plays a limiting role in Russian agriculture. The average growing season, indicated roughly by the frost-free period, is short even in southern Russia. How far north it is located can be best visualized when it is pointed out that Yalta, at the southern tip of the Crimea, is in the same latitude as a point somewhat north of Minneapolis, Minnesota; Odessa, in southern Ukraine, is in the same latitude as Duluth, Minnesota. In Kharkov, the frost-free period is 151 days long—about the same as in southern Minnesota. In Moscow, the average frost-free season is only 130 days, corresponding to that of the northern part of North Dakota. It is necessary to go as far south at Krasnodar, in the North Caucasus, to find an average of 190 days frost free, or about the same as in Omaha, Nebraska.

The short growing season limits the choice of crops and their varieties, and necessitates concentration of farm operations within a brief period, thus increasing the seasonal load. However, the temperature deficiency in the more northern regions of the Soviet Union is to some extent compensated for by longer daylight during the growing season. This factor, together with the use of plant varieties and farm practices especially adapted to the climate and topography, explains the extension of agriculture so far north. I refer here not to the experimental or hothouse type of arctic farming publicized by Soviet propaganda, but to ordinary peasant farming—clearing the vast northern forest, growing such crops as the hardy winter rye and quickly maturing barley, and breeding the famous Kholmogor dairy cow.

No doubt, everyone has read or heard of the long, bitter-cold Russian winter, covering the country with snow and ice. It not only stopped such invaders as Napoleon and Hitler, but also handicaps farmers. Not so well-known perhaps is the fact that over a large part of the country agricultural production is also seriously hampered by moisture deficiency, by frequently recurrent, severe, and devastating droughts.

The area of deficient moisture includes many of the most fertile regions of the famous Russian black-soil belt. Most of the expansion in Russian crop acreage during the past century has taken place in this area of precarious farming. The valuable wheat crop—above all spring wheat, which normally accounts for more than 60 percent of the wheat acreage—is concentrated in this area.

The Crop Yields

It is apparent that the Russian farmer, on the whole, has to wage a stiffer battle against nature than the farmer of the United States or Western Europe. And since nature also blocks any significant expansion of the cultivated area, must we conclude that the Malthusian spectre—the spectre of population outstripping food supplies—actually stalks the land? Not necessarily. There are, in the first place, as was shown earlier, forces at work inhibiting a continued rapid growth of population. In the second place, bringing new land under cultivation, although the traditional method in Russia, still is not the only method of expanding agricultural production. Agricultural expansion has been, and can be, achieved, through increasing the productivity of the land so that per acre yields are higher.

The crop yields in Russia have been considerably lower than in Western Europe and the United States. Moreover, since the early 1930's the actual yields per acre have been even below the officially published figures. These figures refer to the preharvest, so-called biological, yields of the crops standing in the field and do not take into account the admittedly heavy harvesting losses of anywhere from 10 to 30 percent. But even the inflated figures, which, incidentally, incurred the wrath of Mr. Malenkov in the speech cited above, indicate low yields of crops per acre. For example, the average 1933-37 official Soviet wheat yield was a little more than 13 bushels to the acre, compared with 33 in

Germany and nearly 23 in France for the same period. It is hardly possible for climatic and economic reasons to bring the crop yields on the enormous Russian acreage to the high levels of Western Europe. But they can, undoubtedly, be raised even though the Russian climate must be recognized as an important limiting factor. This is attested to by abundant evidence from experiment stations and more progressive farmers, both before and after the revolution.

It should not be forgotten that, until the 19th century, crop yields in Western Europe were also low. In other words, high yields in Western European countries are not due entirely to favorable climatic, and certainly not soil, conditions. Many of the methods that have been used to raise yields are open also to Russian agriculture. And Russia has the advantage of a very large acreage, magnifying the effect of even a small increase in yields.

An important means for improving crop yields in the Soviet Union, as elsewhere, is the increased use of fertilizer. The rapid growth of the Soviet chemical industry and the discovery of phosphate and potash deposits pave the way for such a development. The overall fertilizer situation, however, has not been a favorable one in the U.S.S.R.

Fertilization is absolutely essential in the more northern agricultural regions with their inferior podzolic soils. Inferior soils are, incidentally, also characteristic of most of northwestern Europe, where crop yields, nevertheless, are high. The significance to agriculture, especially the potential significance, of this non-black-soil region should not be minimized. It accounted for roughly one-fourth of the tillable acreage available for crops in the prewar territory of the U.S.S.R., and accounts for an even larger proportion of the present territory. With proper use of fertilizers, with liming, and with drainage in various sections, and other improved farm practices, this region would become more productive. It is suited particularly to such crops as flax fiber, potatoes, various root crops, hay, rye, and oats.

Experience shows that not only can fairly high crop yields be achieved in the non-black-soil region, especially in the more western part, which has the benefits of a milder climate, but that the yields are also, as a rule, more stable here because the region is free from the recurrent droughts that plague much of the more fertile area of the black-soil belt.

For a long time, however, agriculture was only of secondary importance in this region, which historically has been the seat of Russian industrial and commercial development. However, the Soviet Government is fostering agricultural production in the non-black-soil region with a view to making it more self-sufficient. In this the government has doubtless been motivated to a large extent by strategic reasons and the desire to relieve the overburdened railway system of the heavy load of food shipments.

The famous belt of various types of fertile chernozen, or black soils, covers much of the southern and some of the south-central European U.S.S.R. and extends in a narrow wedge into southwestern Siberia and northern Kazakhstan. This belt comprised roughly three-fourths of the estimated prewar tillable acreage available for crops. It is the foundation on which the modern Russian agrarian economy has largely developed.

In a large part of this region, however, as we saw before, moisture is the limiting factor in production. Hence, the strong emphasis on various moisture conserving methods, which, together with other progressive farm practices, have been embodied in various Soviet agricultural programs. In addition, there is the irrigation program, which, if successfully completed and properly managed, should increase yields considerably on the approximately 12 million acres to be irrigated in the European regions of the U.S.S.R. Extensive mechanization of Soviet agriculture undoubtedly facilitates many of these programs, but its benefits are, to a considerable extent, offset by the slipshod work of the state machine-tractor stations.

Thus, modern science and farm technology have made possible considerable improvement in crop yields and, therefore, in agricultural production. The Soviets are well aware of this, as their various programs aiming at improvement of yields testify. In fact, higher crop yields have constituted the central objective of Soviet agricultural policy and planning for the past 20 years.

Incidentally, increased yields of forage crops would help to improve the livestock situation. Animal husbandry has always been the weakest link in Soviet collective agriculture and it, moreover, suffered severely from the war. This weakness, which was admitted by Malenkov in the speech quoted above, has, of course, adversely affected the

living standard of the Russian people. Judging from numerous Soviet reports, shortage of feedstuffs has been a major contributing factor to the unsatisfactory livestock situation—and this, despite the increase in acreage under forage crops and the reduced number of horses. The reason is undoubtedly low yields of forage crops and natural meadows, as well as poor utilization of feedstuffs on collective farms.

It is one thing to desire and plan higher crop yields but quite another to put such plans successfully into operation. The chief obstacles to success are: the rigidity of the thoroughly regimented collective farm system; the deadening party control of science; and the lack of sufficient incentives on the part of the peasant farmers who, for the most part, were forced into the collectives 20 years ago. The government exercises strict control over practically every aspect of farming. National goals are set up for acreage, crop yields, livestock numbers, and a variety of farm operations, from assembling the seed supply to tillage, harvesting, and the mating of animals. These national goals are broken down by republics, provinces, districts, and, finally, by each collective or state farm. A vast bureaucracy of government, party, and collective farm officials, is required to prepare and supervise the execution of these plans.

When you read, therefore, of the remarkable increase in the number of agronomists and other agricultural specialists and technicians in the Soviet Union, remember that many of them are not engaged, or do not spend much of their time, in research or extension or other technical work, but are trying to cope with the vast amount of bureaucratic paper work required by the Soviet system. Every now and then the Kremlin stages a campaign to deflate the ranks of farm bureaucracy at various levels. But judging from the recurrent character of such moves, it has not proved very successful.

It may seem much easier to introduce improved farm practices on a large scale through centralized planning and direction than through persuading the farmer that the new method pays. However, Soviet experience demonstrates that it is not as easy as it sounds. Of course, the lower echelon officials and farmers must make every effort to fulfill the government plan however unrealistic, difficult, or disadvantageous it may be. Hence, there is all too frequently an emphasis on purely formal or quantitative results to the neglect or detriment of the quality of work, which some times borders on sheer falsification. Needless to say, such pseudo-fulfillment does not increase crop yields.

Furthermore, not all farm practices insisted upon by the government are beneficial, or beneficial under all conditions. The classical example is the much advertised pretreatment of seed, called yarovization, or vernalization. It is associated with the name of the infamous dictator of the Soviet biological science, Lysenko. Many millions of acres were planted with seed treated by this laborious and costly method in the 1930's, with little success, according to unimpeachable sources.

And this brings me to a crucial point. Once a "party line" is established favoring some method or practice or theory, whether it be yarovization or a system of crop rotation or tree shelterbelts on farms or the theory of heredity, it is immune from public criticism except for relatively minor details. Only when the "party line" changes, for some reason, is criticism again permitted. But often the monopoly of one dogma is superseded by another monopoly.

If this situation persists long enough, it is bound to result in stagnation of Soviet science. Such a condition cannot be remedied by large appropriations of money to finance research and training of scientists, boasted by the Soviets. In the long run, it is likely to have a detrimental effect on the expansion of agricultural production which, as is well known, depends so much on active scientific progress.

Finally among the important factors militating against higher crop yields is the lack of incentive among the collectivized Russian peasants. They lost their land and independence as small individual farmers in a grim struggle with the Kremlin—a struggle punctuated by all the horrors of famine and totalitarian genocide, referred to euphemistically as the liquidation of the kulaki. The peasant farmer became to all intents and purposes an exploited share tenant worker—with a residual and uncertain claim to his share—on state-controlled plantations, which modern large collective farms actually are. According to the official Soviet doctrine, these farms—the kolkhozy—are supposed to be democratic self-governing producers' cooperatives. But this is a fiction and the term "cooperative," as applied to a modern kolkhoz, is no more justified than the term "democracy" under Soviet conditions. It should be borne in mind that

the collective farmers do not own or control the tractors, combines, and other farm machinery that are used to work their fields. All such equipment is owned and administered by the Soviet Government through the state machine-tractor stations, which are a powerful lever of control over collective peasant farming and an important instrument for extracting revenue from agriculture. Moreover, the screw of Soviet regimentation has been tightened since the end of the war, with the consolidation of a number of collective farms into larger units. The peasants have also suffered even more than the urban population, from the short supply of consumers' goods.

It was admitted by Malenkov in the speech mentioned previously that collective farmers are squeezed by low prices paid by the government for most farm products that are delivered compulsorily. Malenkov also recognized the adverse effect of the Kremlin's policy regarding farming by collectivized peasants in their own little kitchen garden plots. This "acre and a cow" farming has been dear to the peasant's heart and profitable to his pocket; by the same token it has been a thorn in the Kremlin's side. Malenkov admitted that it has become largely an "acre" farming, the cow having been lost in the intensive collectivization of animal husbandry. Such private farming by collectivized peasants has also been harassed, according to Malenkov, by high taxation and burdened by heavy compulsory delivery quotas.

In order to overcome the lag of Soviet agriculture vis-à-vis industry and to increase the output of food and agricultural raw materials, certain relief measures were announced by Malenkov and the Soviet Minister of Finance, A. G. Zverev, as reported in *Pravda* and *Izvestiya,* August 6 and 9, 1953. Prices of animal and dairy products and of potatoes and other vegetables, which the collective farms are forced to deliver to the state, are to be increased. No increase, however, is specified for grain—the most important product of Russian agriculture, accounting for close to 70 percent of the crop acreage.

The compulsory deliveries of collective farmers from their kitchen garden plots and privately owned livestock are to be considerably reduced. Likewise, the complicated, cumbersome system of taxation of this private sector is to be replaced by a simple land tax varying among different regions. The total amount of the tax is to be decreased in 1953 by 43 percent and 1954 by more than 2½ times compared with 1952. The taxes owed on private farming for former years are to be canceled. Collectivized farmers who do not possess cows are to be given tax reductions of 50 percent in 1953 and 30 percent in 1954, to enable them to purchase cows. However, if a member of a peasant household does not contribute, without a valid reason, a certain minimum of labor to the collective farm economy, the tax on the private farming of such a household will be increased by 50 percent. The government has also promised to encourage the private trade of collective farms and their members. Capital investment in agriculture is to be increased.

It should be noted that the promised relief measures do not touch the basic structure of the collective farm system, though they relax somewhat the intensified collectivist agrarian policy pursued by the Kremlin on the eve of World War II and again during the postwar period. It is too early to say how effective these partial concessions within the framework of the collective farm system will be in increasing the incentives of the farmers to work better and produce more. Much depends on the implementation of these policies and on the temper of the Russian peasantry and its faith in the Kremlin's concessions, which in the past proved to be, at best, short lived. The collective farmers may repeat the Russian saying "that one cannot feed a nightingale with tales" and disbelieve the repeated cries "wolf, wolf." However, the exit of Stalin may make a difference and his successors may perhaps be given a chance to prove themselves.

What all this adds up to is that, while nature is by no means benevolent, perhaps the most serious obstacles to agricultural progress in modern Russia are to be found in its present-day political and economic institutions. But the weakness of Soviet agriculture should not be exaggerated. As Peter Wiles, British student of Russian economy, recently put it: "Agriculture is often described as the Achilles heel of the Soviet economy. But while this is true, it is less often remembered that Achilles could after all walk upon his heel." (*Foreign Affairs,* July 1953.)

This is particularly true of the relationship between the Soviet Government and agriculture. The Government might loosen somewhat the reins, as the recent concessions to farmers attest; but it is likely to continue its firm grip on agricultural production and extract its large share of the output, come what may.

Oriental Rugs of Iran*

Woven into the carpets of Iran are the products of its agriculture and the skill of its people.

Home-produced wool, cotton, silk, and dyes are transformed by the art of the weavers into quality carpets known the world over.

Carpets have been woven in Iran for centuries—first, by nomads and town dwellers who used the rugs for floor coverings, wall and tent decorations, and as a medium of exchange in the payment of taxes and tribute, and later, by commercial establishments as well.

Today rugs are produced in much the same way as in the past, by the nomadic tribes who carry their looms with them and weave wherever they may be; by the hired weavers, mostly children, who operate the several looms in the small factories; and by the women and children who work the simple household looms on a part-time basis either for themselves or for a loom owner if they do not own their loom.

The rug-maker—household, factory, or tribal—may produce the wool, cotton, silk, and dyes that go into the rugs, or he may obtain them from a bazaar or the loom owner for whom he works. In most instances the rug-maker uses wool for the pile of the rug and cotton, which stretches less than wool or silk, for the warp. Some rug-makers mix cotton and silk, or one of them, with wool for the pile; some make all-silk rugs; and tribal rug-makers often use wool for both the pile and warp.

The quality of the wool and dyes determines to a large extent the quality of the rug—its softness, luster, and durability. The finest rugs are made from wool that is taken from the back of a live sheep and colored with vegetable dyes. When wool from the various parts of a sheep is spun together the quality is not so good. And artificial dyes tend to make the pile brittle and weaken the durability of the rug.

The wool is cleaned, spun, and dyed just about as it was 300 or 400 years ago. The sheep is washed in a stream before being shorn. Then the fleece is moistened and tramped on to remove more dirt. After further washing, it is spun. Then it is treated with a mordant and dipped in dye. Several factors are important in the dyeing process: The quality of the wool (which depends on climate, grazing, the way the wool is shorn, the parts of the sheep from which it is taken), the quality of the dye (which in the case of vegetable dyes depends on factors such as the age of the root or vegetable), the water that is used (its hardness or softness,

Little girls work at a carpet loom in Hamadan, Iran. Tying the fine tight knots required for Persian carpets calls for the small, flexible fingers of the very young.

*Based on foreign service reports by George M. Barbis, Economic Assistant, American Embassy, Tehran, Iran.

gypsum, lime, or other content), and the temperature of the dye solution.

Quality workmanship, as well as the best of raw materials, is needed to produce a fine carpet. The design must be faithfully copied, the rug must be kept in shape on the loom by adjusting and tightening the warp and woof, and the knots must be tight.

Making hand-made Persian carpets is work for the very young. The ideal beginning age is about 7 years, before the skin of the fingers hardens and when the fingers are small enough to make the fine tight knots required in the best carpets. In the commercial establishments most of the workers are girls, and few of them are more than 18. They leave to marry or because they have lost their touch. The girls must serve a training period during which they fill in the solid parts of the carpets between the designs. By the time a girl is 15 she can work by herself from a section of the design that is given to her. The period of greatest productivity is between the ages of 15 and 18.

As they work, the weavers face the carpet, squatting on a board. Workrooms are rarely heated, for the wool is best handled at room temperature. There are no artificial lights: the colors must be matched by natural light.

Usually more than one weaver works on a rug. The completion of a rug, depending on its size, design, and the number of knots per square inch, takes from several months to a few years from the time the weaving is started.

After the carpets are woven, they are washed in the river, scrubbed with soap, and often softened by being rubbed with some rough-edged object like a stone.

Carpet designs were greatly influenced by the introduction of Islam and its schism into Sunni (orthodox) and Shiite sects. One group of designs reflects the Sunni austerity and is limited to geometrical and angular forms. The other group expresses the Shia spirit in animals, trees, blossoms, and flowers. The forms commonly used in carpet designs today, as years ago, include: the medallion center, floral forms and patterns, tree of life patterns, pear pattern, palm leaf designs, diagonal stripes, geometrical patterns, flowers, figures of birds, animals, and people, plain fields with angular or floral ornamentation. Sometimes weavers include inscriptions from verses of the Koran and Persian poets or flattering dedications to feudal chiefs or wealthy buyers when the rug is ordered for a mosque or special person.

For many years a rug could be identified by the design alone, for each locality followed a traditional local pattern. The expansion of transportation and communication facilities and the greater commercial organization of the rug trade led to the designs peculiar to one producing locality being imitated in several others, but the design still tends to be characteristic. Turkoman, for example, produces rugs with geometric designs in red, orange, brown, black, blue, and white, while Isfahan produces rugs with rich floral patterns or animal decorations in deep red, blue, and green.

Rugs can also be identified by the quality, for although the methods and organization differ little between producing centers, each locality produces a rug that is more or less characteristic in quality, as well as design. The quality may vary somewhat within a locality, but a certain standard prevails. The raw materials and workmanship of Kashan, Kerman, Isfahan, and Nain rugs are usually of the best quality, and these rugs have the reputation of being the finest. Some of them have as many as 1,000 knots per square inch, while most good rugs have only 300 to 400 knots per square inch, and some tribal rugs as few as 40 to 50.

Iran's rugs are in demand both at home and abroad. In Iran the rug is an important article in almost every household, poor or prosperous. As a rule, even the poorest family owns at least one small prayer rug. A bride usually takes rugs with her as part of her dowry when she marries. And wealthier Iranians frequently invest part of their savings in rugs, which are readily convertible into cash and easily stored at home. Abroad, the design, colors, and quality of Iranian rugs seem to meet the market requirements at least as satisfactorily as other oriental rugs, and they generally command a high price. The greatest competition comes from machine-made carpets.

So far the machine has not been given the opportunity to alter the traditional character of the Iranian carpet. However, settlement of the oil problem, resumption of economic development programs, and increased industrial activity may create a manpower problem that will affect carpet production. Mechanization of the industry would destroy the highly individualistic quality of this ancient art upon which its export value rests.

Norway Is Developing The Agriculture of Its Northland

by RALPH S. YOHE

Nearly half the length of Norway lies above the Arctic Circle. In this most northerly farming region in the world live more than 10 percent of Norway's 3¼ million people. Most of them live on the land—many of them fishermen who farm part time—but even so they do not produce enough food for themselves and the townspeople of this far northland. Large quantities must be shipped in. This is a serious problem, since southern Norway does not have a surplus of food. In all the country, there is little more than half an acre of cultivated land per person.

To develop the agriculture and industry of the far north, and to encourage investment there, the Norwegian Parliament approved a 10-year North Norway Development Fund about a year ago.

The equivalent of $28 million was set aside as the government's part in developing the area. More than $11½ million has been appropriated this year for dairy improvement, for building slaughter plants, developing new land, increasing the number of reindeer, building new farmsteads, expanding agricultural schools, establishing farm machinery stations, and increasing the number of agricultural advisers and veterinarians.

Last summer I drove up the one road that connects the south with the far north. Occasionally along the way Diesel-powered ferry boats transported my car across the fjords. Along the coast of northern Norway, these long fingers of greenish-blue salt water cut into the jagged snowcapped mountains. Scattered farmsteads dot the pleasant valleys. Red barns are stuffed with hay. Cows and sheep graze along the streams.

Inland, the mountains give way to the high vidda —rolling plateaus—covered with twisted birch, small clear lakes, and peat bogs. This is the home of the nomadic Lapps, who herd reindeer for a living.

More than half a million acres of pine forest covers the foot of the mountains and the lower vidda, gradually giving way to the hardier birch.

High underwater banks off the coast hold back the frigid waters moving down from the Arctic. The Gulf Stream sweeps along the coast to fill the fjords with warm water. It and the banks prevent the country from being a wasteland of snow and ice. The climate is similar to that of Fairbanks, Alaska.

Here in the far north are the oldest settlements in Norway; along the coast, man lived at least 8,000 years ago. Here are the vast fisheries of the Lofoten Islands. Near Kirkenes on the Russian border lie Norway's largest iron pits. Much of Norway's limited mineral wealth is locked in the mountains of the far north. But even so, Norway's north country has remained its backward area. Seasonal unemployment forces a low standard of living on many of the north people. Capital to open up new industries and increase the size of the too small farms is lacking more often than not.

This area includes Norway's three northernmost Provinces—Nordland, Troms, and Finnmark. Nearly 60 percent of the people in this north country live on farms in the coastal area. About 14 percent live in widely scattered towns and settlements, most of which, like Bodö, Harstad, Narvik, Tromsö, Hammerfest, and Vardö, lie along the coast. The rest of the north people live in the interior of the country, where they earn a meager living at fishing, farming, and herding reindeer. Many inland communities have no electricity. There are few factories. The crooked, stony roads are few and poor. In the winter they are blocked by snow. Schools are far apart and inadequate. Until recently the only connection between northern and southern Norway was by ship or by road through Sweden. Even today there is no rail service above Narvik.

As I drove up the long, crooked, gravel road that goes all the way to the Russian border, I passed burned-out barracks and heaps of twisted tanks and trucks. Blown-out cellars, broken concrete founda-

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The most northerly agricultural experiment station in the world, Holt—at Tromsö, Norway—figures prominently in the development of agriculture in Norway's northland. Director Flovik and Mr. Yohe stand in a field of Engmo timothy, a variety developed by the station.

tions, and occasionally the ruins of a chimney were all that was left of many farmsteads. Everything was destroyed as the German army retreated during World War II. All along the roads were newly built houses and barns. But even so, less than three-fourths of the farmsteads destroyed in the north have been rebuilt.

To find out more about farming in the north, I first stopped at Tromsö. There I visited Holt, the most northerly agricultural experiment station in the world; it was officially started in 1920. Here are being tested new varieties of crops and vegetables suitable for northern conditions. It is well known that many crop varieties that do well in the rest of Norway will not yield well here if they survive at all.

In this far north country, summers generally begin about the first of June and end in September. The average temperature for July, the warmest month, is 52°F. The temperature in summer rarely reaches 80°. Along the coast in winter it hovers a few degrees below freezing, rarely dropping to zero. Inland, the winters are more rugged, but not unbearable. On the whole, temperatures in winter run around 50 degrees or more warmer than those in similar parts of the world—in northern Canada or Alaska, for instance.

From the middle of May until the end of July, the sun never sets. Around the first of December it disappears below the horizon and for 2 months the land is in semidarkness. For a Midwesterner like myself, these seasonal phenomena bring about peculiar things. I noticed, for instance, that roses and tulips were in bloom at the same time.

In the never ending sunlight of the short summer plants grow fast. Potatoes and barley mature. But farming is not easy in this far north country. A late thaw may put off potato planting for as much as a month. In extreme years cabbage may not head. Timothy will make seed only about once in 5 years. Occasionally even barley does not mature. And in rare seasons workers at the station have had to clear away a foot of snow before the potatoes could be dug.

Then, too, farmland is limited to certain valleys, areas along the coast, and the offshore islands. The rest is steep snow-covered mountains or the wild tundra—the vidda.

At present, under Norway's program for developing the north, farmers may get loans from the

government for clearing new land or establishing homesteads. About 3,000 new farms have been taken by homesteaders. That is why, today, the experimental station at Holt has taken on added importance.

By American standards the experiment station is not large. It has about 50 acres of cultivated land. Operating on a slim budget, the station continues to clear more land each year. Since much of the land is peat type soil, it must be drained with extensive tiling.

A dairy herd is kept to furnish manure for the fields and added income for the farm. Then, too, scientists at the station are interested in developing dairy management practices that can be used on the farms in this part of the world.

Ninety percent of the land on farms in the north is kept in grass, for it is a dependable crop in the short, unpredictable summers. This grass must be turned into milk and meat.

Director of the station is Dr. Karl Flovik, an expert on plant life in the far north. He has studied in Finland and traveled in northern Canada and Alaska.

Says Director Flovik, "Farming conditions here are almost identical with those I saw at Fairbanks, Alaska, except that I think farmers in Alaska have greater opportunities. If I were a younger man, I would go to Alaska to farm.

"Farming in the far north is quite different from farming in other parts of the world. For instance, we have found here at the experiment station that potatoes yield best when planted a little less than 2 inches under the soil. That seems quite shallow. But if we plant them as much as 4 inches deep, the extra growth needed to reach sunlight so handicaps the plants in our short summers that it cuts yields by more than a ton an acre."

As we walked across the fields, I saw test plots of timothy, potatoes, carrots, and cabbage. I noticed that the potatoes in one plot were larger than those in the others and that the leaves of the large potatoes were a much lighter shade of green.

The director explained that in this north country the amount of leaf surface on the plants is more important than the shade of green.

I had already noticed that the trees and grass were a light spring green.

"Potatoes yield well," Flovik stated, "since we have practically no diseases. Yields will go to 14 tons. I think it should be possible for farmers in this area of the north to grow seed potatoes to send farther south."

Then he pointed to a plot of timothy nearby. "That," he said, "is an 8-year-old plot, a variety that the station has developed from old strains of timothy brought by the farmers from farther south many, many years ago. We call it Engmo. After my visit to Alaska, I sent some seed to the Alaska experiment station. It has done so well there that next year it will be distributed to the Alaskan farmers for seed production.

"Here along the coast we have difficulty getting timothy to produce seed. Normally we get seed only 1 year out of every 4 or 5, so most of our timothy trials are carried on inland, where it gets warmer in the summertime. In order to provide seed for farmers here, we send seed farther south, where it is multiplied and the seed then brought back for farmers to plant. But we must send the source seed down as often as possible. Otherwise the timothy will soon get so it will not grow well this far north.

"Grasses here are leafier than they are farther south. And they have a higher protein content. Timothy has twice as many leaves as it has in southern Norway and nearly twice as much protein."

Then I asked Director Flovik why they did not grow clover, for I had seen wild red clover blooming along the roadsides.

"It is true," he told me, "that you will see some red clover plants growing wild. But it produces little seed, because we have very few bees here; it is difficult for them to survive the long, hard winters."

As we walked back along the road to the big white and red buildings of the experiment station, I glanced back across the plots. Though it was now 8 o'clock in the evening, the sun was high and shining across the fjord. In the background were snow-capped mountains. And nearby, farmers were stringing the green, damp hay on wires in order to dry it.

To learn what was being done on the farms, I stopped one afternoon at the village of Burfjord to talk with a county agent. The little village consisted of a few houses, two cooperative general stores, and a red boathouse along the small wharf.

Solmund Berntsen, the county agent, told me that there were 400 farms in his district, which

lies in the heart of Norway's middle-north Province of Troms. There are about 47,000 small farms scattered along the vast stretch of land that makes up the three north Provinces.

Only 20 of the farmers in Berntsen's district worked on their farms full time. The others spent some of their time fishing and helping to build roads and buildings, for their farms are too small to provide a living. Here as elsewhere in northern Norway, there is an average of about 5 acres of cultivated land per farm but most farms have land in undrained peat bogs that could be tilled if the bogs were drained.

Small farms are one of the big problems of the far north. Through the years, cultivated land has been divided up to make room for new farmers.

The county agent told me that in his district there were at one time only 45 farms; today there are 400. Most of them are the result of division and redivision of land.

"Under the North Norway Plan," the county agent said, "the government grants 80 percent of the cost of clearing new lands, up to 19 acres, to increase the size of existing farms. In addition, it is developing new farms on the vidda. It builds roads, drains the land, and sells it to farmers at a reasonable price. The farmers themselves must build their own buildings.

"Production per acre is very important here, where there are so few acres of cultivated land," the county agent continued. "We can get good yields of timothy and potatoes, but we still need to use more fertilizer. When I came here in 1939, the farmers used no fertilizer. They are using some today, but only about a fourth of the recommended amount. To encourage the use of fertilizer, the government makes special fertilizer grants of up to $3.50 an acre.

"Milk production per cow should be higher, too. North Norway's 100,000 milk cows produce only about 168,000 tons of milk a year—a little less than 3,500 pounds of milk per cow. By proper management and feeding we could reduce the number of cows by a third and still have the same amount of milk.

"In my district," the county agent told me, "we have about 3,500 sheep and enough summer grazing for at least 12,000. In all of north Norway there are 350,000 sheep and summer pasture to keep 800,000. That is why it is important that we grow more and better quality hay, for at present it is winter feeding that limits the number of sheep we can keep. A big problem is to get enough hay put up to feed livestock through the winter. Livestock must stay indoors 5 months of the year."

Under the North Norway Plan, special pasture consultants help the farmers with their pasture problems. The government conducts special schools to train both the people and the dogs to care for sheep and on its own land builds huts, fences, and special round-up corrals for the sheep herders.

In order to encourage production of sheep, the government is helping to establish tanneries, where sheep pelts will be processed so that they can be used as fur.

The north is gradually mechanizing. Two cooperative machine stations have recently been built in the Burfjord district and the government is furnishing money to establish several machinery cooperatives. Five farmers have English-made tractors. Altogether there are only about 500 tractors in the north, but many farmers cannot use tractors; the land is too steep and stony.

There are plenty of horses in the north. When the Germans were driven out of the country, they left their horses behind.

"In my district," the farm adviser told me, "we have consolidated schools. The students come in by bus or, if their homes are on hard-to-reach islands, live at the schools in dormitories. We have enough grade schools, but the big problem is high schools. The youngsters must go into town to go to high school so many do not get to go."

More agricultural education is needed in the north country. At present only four 1-year agricultural schools serve the entire north. Under the North Norway Plan, one of the schools is being enlarged and another will be built. Money has already been granted for local farm short courses. These night courses for the farmers themselves last for 1 or 2 months.

I asked County Agent Berntsen about the Lapps of North Norway, who, I had heard, depended on reindeer raising for a living.

There are about 200,000 Lapps in northern Norway now, but only about 1,400 of them still keep reindeer. Many Lapps who gave up reindeer herding have settled on small farms. Some of them have been successful, but most of them barely make a living. Their farms are very small and the soil

is poor and difficult to cultivate. During the war most families lost many of their reindeer, and most of the herds are small. Under the North Norway Plan, Lapp families will be able to borrow money from the government to buy additional reindeer. A family must have at least 200 reindeer if it depends on them for a living. Only 124 families have more than 200 head.

Reindeer are especially important to the Province of Finnmark. Sixty-five thousand reindeer furnish the 65,000 people of the Province about 18 pounds of meat each per year, approximately 50 percent of the red meat supply.

Forestry is also important to the North Norwegian farmer. Many of the farmers work in the forest during the wintertime. But only the larger farms have forests. The rest of the forest land is owned by the government, which hopes to improve its own forest land and furnish advisory foresters for private owners.

In the days following my visit with County Agent Berntsen, I visited many farms in the far north. On the good farms, yields were high. Timothy regularly cut 4½ tons of dry hay per acre, sometimes even as much as 6 tons. Potatoes yielded 14 tons per acre. Carrots, cabbage, and cauliflower grow big during the cool summers. Livestock thrives in the invigorating climate. Although farming in the far north is an exacting and rigorous life, it can be both practical and profitable.

Hay is an important crop in Norway's far north, but, like the other crops grown there, it is generally harvested by hand, for most of the farms are too small for economical use of power machinery. Norway's plans for developing its northland call for increasing the size of farms.

World Agricultural Library—The David Lubin Memorial

The David Lubin Memorial Library of the Food and Agriculture Organization of the United Nations was inaugurated a year ago in Rome.

Honor guests at the inauguration were the children and the secretary of David Lubin, founder of the Institute Internationale de l'Agriculture and of its library of some 350,000 publications, which now form the most substantial part of the FAO library of about 400,000 works.

Housed in the modern building made available to the FAO by the Italian Government, the library contains reading rooms and reference, photostat, and microfilm services, and approximately 11 miles of shelves.

In opening the library to the public, the Director of the Food and Agriculture Organization, Norris E. Dodd, said, "It is a living resource for the service of the world's agriculture. We want to make it as open as possible to all scholars and technicians and research workers."

But who was David Lubin? In the words of Mr. De Castro, Chairman of the Council of FAO, he was "one of those visionary pioneers" who, through courage and determination, transform their visions into reality. He was born in Poland in 1849. He moved with his family to the United States at the age of 2 and was a full-time wage earner at 12. In 1874 he became a merchant in Sacramento. His store, using novel ideas to introduce a fair sales price through the system of fixed prices, was tremendously successful and contributed greatly to the development of the modern department store idea. The prosperity of this early department store and mail order house enabled Lubin to devote his last 25 years to public welfare projects.

In 1880 Lubin became interested in wheat and fruit growing in California. He fought successfully unregulated monopoly control of freight rates and centered the attention of the world on price-making forces.

His observations on the results of speculation on farm prices led him to conclude that there should be an international clearinghouse of information on agricultural crops, available to farmers of all nations. When the Governments of the United States, England, and France rejected his proposals as being premature if not impracticable, Lubin continued to stump for his beliefs. Finally in 1905 the King of Italy called an international conference to draw up a plan for what developed into the International Institute of Agriculture in 1908—the world's first truly international organization.

The purpose of the IIA was to promote economic cooperation between governments. Lubin was convinced that commercial prosperity rested on agricultural prosperity and that an international agency of governments was needed to establish and maintain a just balance between industry and agriculture. The work of the IIA ended on July 31, 1946, but is being carried on by FAO.

The David Lubin Memorial Library is made up of three collections—those of the former IIA, the International Sylvicultural Centre, and the small FAO library of 30,000 volumes collected while temporary headquarters of FAO were in Washington.

The library is rich in its collection of agricultural statistics, for the collecting of world-wide statistics was a primary aim of the Institute. The library also has a comprehensive collection on agricultural economics, rural sociology, agricultural legislation, and sciences related to agriculture, such as botany, zoology, and chemistry.

The Marquis Cappelli, one of the first presidents of the Institute and a great book-lover, collected a thousand volumes in his period of office, and bought, among other books, some of the Institute's 32 incunabula. These fifteenth century works are not only collectors' items but are primary source material of unquestioned importance. Works of literature and philosophy owned by the Institute in their early Italian or German editions are: the *De animalibus* of Aristotle, the *Genealogia deorum* of Boccaccio, *De rerum natura* by Lucretius, and the *Historia naturalis* and *Storia naturale* of Pliny.

The Lubin library continues to grow as new additions reach it from all over the world. And as it grows, the memory of its founder becomes brighter.

Witloof, Belgium's Most Popular Winter Vegetable

By ROBERT N. ANDERSON

A leafy vegetable that can be produced in commercial quantities during the bleak damp winters of northern Europe is bound to find a ready market not only among consumers at home but among those in neighboring countries as well. Such a vegetable is witloof, or Brussels endive, an important specialty crop of Belgium for three quarters of a century. Witloof—a Flemish word meaning white leaves—is a subvariety of the Magdebourg coffee chicory *Cichorium intybus*. The roots for witloof are grown in summer—in open fields in much the way that sugar beets are grown—and placed in trenches in winter, when the tight cylinder of leaves that is the vegetable itself is produced.

Witloof is said to have been discovered by a gardener of the Brussels Botanical Gardens, who noticed the white leaves growing from a chicory root buried in a small mound of earth. In 1845 it was decided to investigate the feasibility of cultivating the plant as an edible vegetable, and by 1875 the cultivation and use of witloof had progressed so far that exports to France were begun.

At first the witloof beds were kept warm by a covering of rich farmyard manure. Later, various heating devices were installed, and today most growers use small stoves for heating the water in a boiler that is connected to pipes that run through the length of the trenches. A common sight in the farmhouse yards around Brussels are these stoves set at the ends of rows of low, make-shift, quonset-type huts. And the smoke that rises from them is an indication of warmth and activity that is welcome in the damp, dull winter evenings.

More than 90 percent of the witloof grown in Belgium is produced in the Brabant Province, especially in the triangle between Brussels, Louvain, and Malines. In this area of very small farms, witloof production constitutes the main income of many of the producers. Smaller quantities of witloof are grown near Ghent, Mons, and other Belgian cities, mostly for local consumption. There are about 6,000 witloof growers in Belgium at present, who produce an estimated 65,000 tons annually.

Witloof is available throughout the winter, for the growers leave the roots in the trenches for a period varying from 2 weeks to 5 months, depending on when they wish to harvest. Two or three weeks before the witloof is wanted, trenches are heated for forcing the growth. Sufficient heat is applied to keep the whole trench at about 60° F. during the forcing period.

Harvesting may begin as soon as the witloof leaves begin to show above the soil covering. The witloof is then about 6 inches long and 1½ inches in diameter at the base. The stove may then be taken to another pair of trenches.

After the covering and straw is removed, the witloof is lifted very carefully with a fork. The tops are then separated from the roots by hand, placed in baskets, and taken to the house. Here the witloof is cleaned—the outer leaves removed—and it is sorted and carefully packed in pasteboard boxes for market. The roots are not discarded; they are either sold to a processor for making coffee or used for livestock feed.

Almost all of the witloof is cleaned by the farmer and his family in the farm kitchen. If the witloof is for export the exporter or his agent does the sorting and packing—also in the farm kitchen.

For the domestic market, producers sell witloof to a vegetable wholesaler, local retailer, or, in rare cases, directly to consumers.

Before the war, well over 50 percent of Belgium's witloof was exported each year. About 85 percent of the exports went to France and most of the remainder to the Netherlands, Switzerland, United Kingdom, Germany, and the United States. Since the war, exports have been much smaller, partly because many of the Belgian farmers who have emigrated to France in recent years have started producing witloof in the Paris region and are competing with Belgian growers for the export market.

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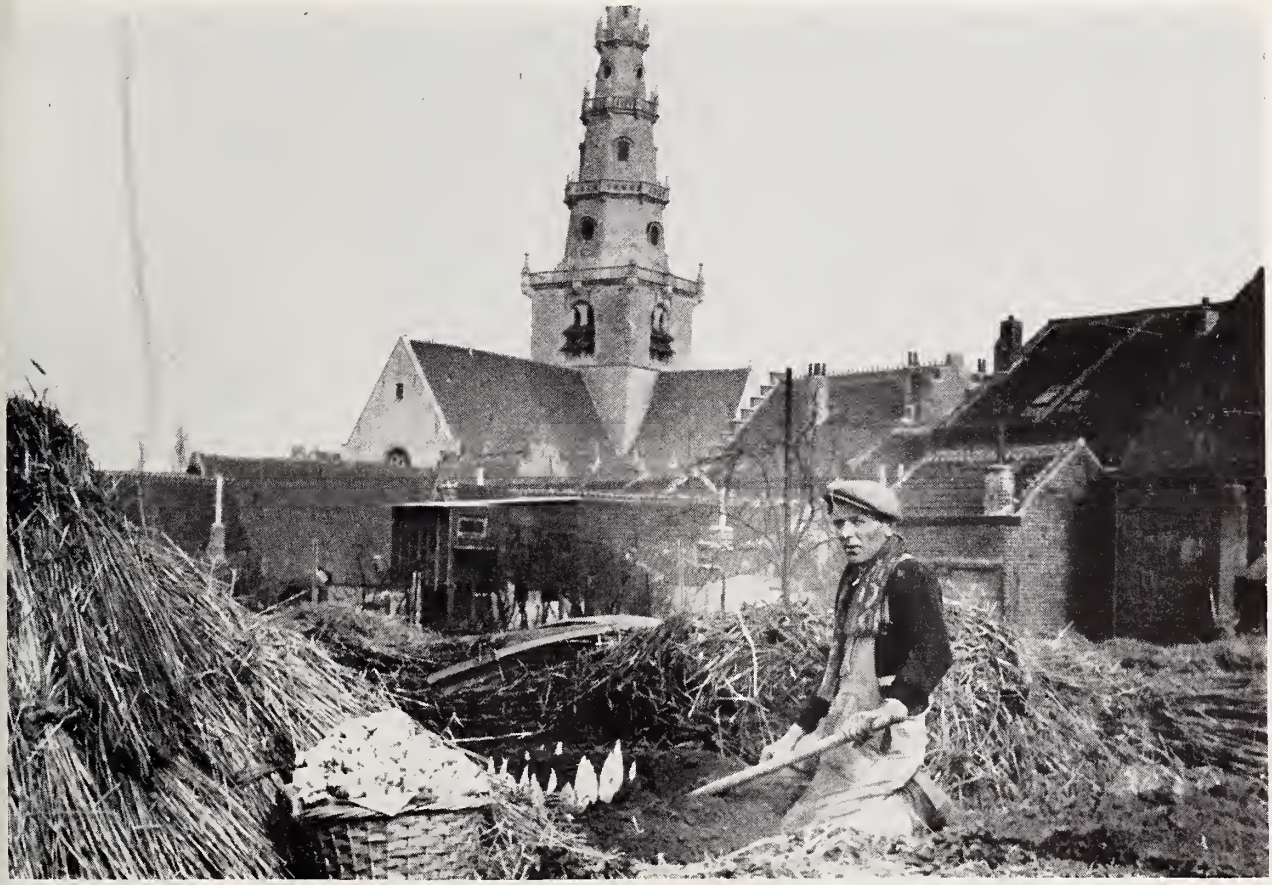
Witloof, the cylinder of white leaves that grows from chicory roots, is served raw in salads or as a cooked vegetable. The roots go into coffee or are used as feed.

Covered, heated trenches provide an environment in which witloof thrives. These trenches are a common sight in the yards of Belgian farmhouses.

Most witloof growers use small stoves to heat the water that runs through the pipes in the root-filled trenches.



Growers supply the markets with fresh witloof all winter long. Two or three weeks before they want the witloof, they heat a trench and the leaves begin to grow.

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